

# A new hydrobiid snail from a saline spring in southern Alabama (Gastropoda, Prosobranchia, Rissooidea)

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**Abstract:** *Pseudotryonia grahamae* n. sp. is described from a saline spring in the Tombigbee River System in southern Alabama. It is most similar to *P. brevissima* (Pilsbry, 1890) from central Florida, but is distinguished by its larger shell with an indented parietal margin and its male reproductive system with two papillae along the inner curvature of the penis.

**Key Words:** Gastropoda, Hydrobiidae, *Pseudotryonia*, saline spring, Alabama

The North American freshwater snail fauna still remains largely unknown, with many species remaining to be described. Large geographic areas have not been surveyed adequately to document their faunas reliably, nor have unique habitats been examined sufficiently to reveal local endemics, such as the new species described below. Furthermore, a large diversity of species now buried as nomenclatorial synonyms remains to be recognized as valid (Thompson, 2000).

Alabama is one of the most extensively surveyed states in North America. It has long attracted the attention of naturalists because of the spectacular molluscan faunas of the Tennessee Alabama River basins. The diversity of unionid pelecypods and pleurocerid gastropods is unparalleled elsewhere. The major rivers then were exciting places for collecting mollusks. Virtually every shoal produced buckets of large and spectacularly ornate local endemics, all of which could be plucked from the substrate in large numbers and then graded for the choicest of specimens. Special techniques needed to collect smaller and more secretive species such as hydrobiids were seldom employed, because the diversity of the macro-fauna completely occupied the collector's time and attention. Smaller streams with their relatively depauperate faunas received little attention, and isolated springs were seldom visited. It is not surprising that novelties, such as the species described below, still remain to be discovered. The species described here is particularly interesting because of its habitat (Figs. 1-2) and its biogeographic affinities.

## *Pseudotryonia grahamae* Thompson new species

Salt Spring Hydrobe

**Diagnosis.** A species of *Pseudotryonia* with three glandular penial lobes; one occurs near the middle of the outer curvature; two are juxtaposed on the inner curvature near the terminus. This snail differs from other known species by having two papillae along the inner curvature of the penis. The shell is distinct because of its convex spire, deeply impressed suture, adnate aperture, and rimate umbilicus. The shell is larger and has more whorls than similar species.

**Shell.** (Figs. 3-4, 6-17). Large, adult females up to 5.0 mm long with 5.5-6.4 whorls; males reach a length of 3.8 mm and have up to 5.3 whorls. Shell thin, hyaline, olivaceous gray. Shell elongate, about 0.46-0.56 times as wide as long. Spire convex in outline, particularly along the first four whorls; the last two whorls tend to become cylindrical. Suture deeply impressed. Initial protoconch whorl sharply protruding, 0.15 mm in diameter perpendicular to the initial suture. Subsequent whorls inflated; whorls of middle and lower spire shouldered and tending to be less convex below the periphery. Whorls nearly smooth, sculptured with fine, irregularly-spaced incremental striations, and much finer and more densely spaced segmented spiral striations. Umbilicus narrowly rimate; partially obstructed by the columellar margin of the peristome. Aperture subovate in shape; flattened along the parietal margin; height of aperture about 0.35-0.42 times the length of the shell. Axis of aperture inclined at about 11-18° to shell axis. Plane of



**Figs. 1-2.** Salt Springs, Clarke Co., Alabama. Scales are indicated by the 18 kg corgi dog in Figure 1 and the 3.8 liter plastic bucket in Figure 2.

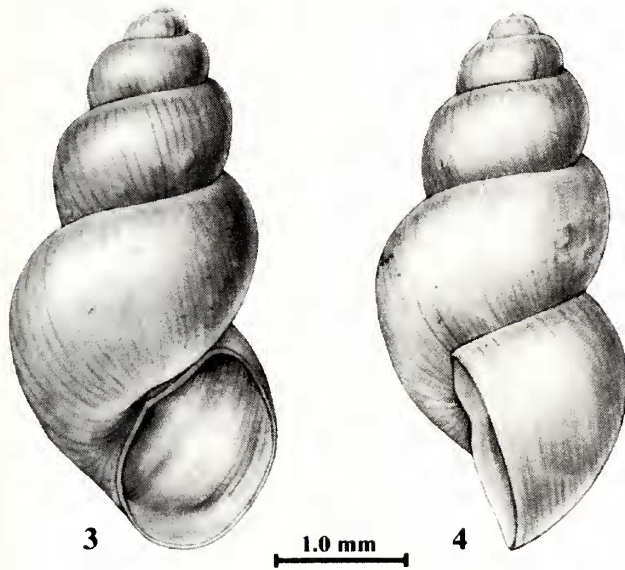
aperture prosocline at about  $16-23^\circ$  to shell axis (Fig. 4). Peristome simple, thin and fragile, continuous across parietal margin, and tending to be solute from previous whorl in older specimens (Figs. 3, 11, 12); parietal margin arched forward near middle (Fig. 4).

**Sexual Dimorphism.** The shells are sexually dimorphic in shape and size. The sexes are readily distinguished even among juvenile shells. Females are more obese because of the slightly enlarged third whorl (Figs. 8-9). This is most apparent when the shell is viewed from the side posterior to the aperture. Males are more slender and tend to have a more noticeably impressed suture (Figs. 6-7). In order to verify gender the author selected 25 of the obese juvenile form and 25 of the slender juvenile form and denuded them of shells by placement in Bouin's Fixative. All had fewer than four whorls. The slender forms consisted of 24 males

and one female. Among the obese forms 23 were females and two were males. The females larger than about 3.5 whorls in size and 1.5 mm long contain embryos in the uterus.

Adult females have a more robust apex than do males, but this is not as apparent in adults as it is among juveniles. Selected dried adult specimens were measured and the shells were dissolved in Bouin's Fixative in order to determine gender. Shells greater than 4.0 mm in length consistently were females. Adult male shells were difficult to recognize among shells less than 3.8 mm in length. Measurements for adult female and adult male shells are in Tables 1-3.

**Anatomical Features.** The head-foot of the animal is black with a light gray muzzle. The front and sides of the foot are also light gray. The tentacles are black with a



Figs. 3-4. *Pseudotryonia grahamae* new species. Holotype (UF 267620).

lighter basal zone, as well as a narrow gray band near the tip. The penis is light gray with darker pigmentation near its base. The mantle generally is light gray, as is the mantle collar. A transverse zone just posterior to the mantle collar, the area over the intestine, and the area over the digestive gland may be black, diffusely pigmented or light gray in color.

The penis (Fig. 5) is small and is located on the nape just to the right of the mid-dorsal line. It is strongly curved to the left when withdrawn beneath the mantle collar. The basal half is swollen and almost bulbous. The distal half is more slender and nearly uniform in width with a rounded apex that is nearly blunt. The penis bears three nearly equal-sized glandular lobes (gl), two along the inner curvature near the distal end, and another glandular lobe along the outer curvature just past the bulbous basal half. The glandular lobes are nearly equal-sized and are weakly constricted at their bases. The distal end of the penis bears a short acute terminal filament (tf). The vas deferens (vd) enters the base of the penis near the right margin. It is slightly convoluted, and it exits the penis through the terminal filament.

**Type Locality.** (Fig. 18). Alabama, Clarke Co., Salt Spring, Fred T. Simpson Wildlife Refuge, ca. 13.8 miles south-southeast of Jackson (31°22.7'N, 87°52.9'W) (FGT 5473). **Holotype.** UF 267620; collected 31 August, 1994 by Fred G. Thompson, Richard Heard and Becky C. Graham. **Paratypes.** UF 230742, USNM 860751 (ex UF 230742) (dry and wet), UF 230743, USNM 860752 (ex UF 230743) (dry and wet), UF 230744, USNM 860755 (ex UF 230744) (dry), USNM 860753 (dry), USNM 860754 (ex UF 230745) (dry), USNM 854832 (dry; DNA vouchers).

**Table 1.** *Pseudotryonia grahamae* n. sp. Shell measurements of holotype (UF 267620) and 10 adult female shells (UF 230744, Paratypes). L = standard length, W = standard width, AH = aperture height, AW = aperture width, Wh = whorls.

	L	W	AH	AW	Wh	W/L	AH/L	AW/AH	Wh/L
Holotype	4.29	2.11	1.58	1.28	5.40	0.49	0.37	0.79	1.26
min.	3.76	1.52	1.39	1.06	5.0	0.38	0.34	0.76	1.19
max.	4.36	2.11	1.58	1.25	5.5	0.53	0.39	0.86	1.41
mean	4.06	1.97	1.49	1.20	5.29	0.48	0.37	0.81	1.30
S.D.	0.19	0.16	0.06	0.06	0.14	0.04	0.01	0.03	0.06

**Table 2.** *Pseudotryonia grahamae* n. sp. Shell measurements of 20 adult female shells. (UF 258439, Paratypes). L = standard length, W = standard width, AH = aperture height, AW = aperture width, Wh = whorls.

	L	W	AH	AW	Wh	W/L	AH/L	AW/AH	Wh/L
min.	3.87	1.98	1.55	1.24	5.5	0.46	0.33	0.72	1.25
max.	4.96	2.36	1.74	1.36	6.3	0.56	0.44	0.83	1.43
mean	4.35	2.18	1.66	1.28	5.9	0.50	0.38	0.77	1.34
S.D.	0.33	0.10	0.08	0.04	0.3	0.03	0.03	0.03	0.08

**Table 3.** *Pseudotryonia grahamae* n. sp. Shell measurements of 10 adult male shells from Sta. 5627 (UF 258439, Paratypes). L = standard length, W = standard width, AH = aperture height, AW = aperture width, Wh = whorls.

	L	W	AH	AW	Wh	W/L	AH/L	AW/AH	Wh/L
min.	3.19	1.72	1.25	1.06	5.0	0.49	0.40	0.72	1.38
max.	3.76	1.98	1.55	1.22	5.3	0.56	0.44	0.85	1.60
mean	3.46	1.84	1.43	1.13	5.1	0.53	0.41	0.79	1.48
S.D.	0.21	0.08	0.11	0.05	0.09	0.02	0.02	0.05	0.08

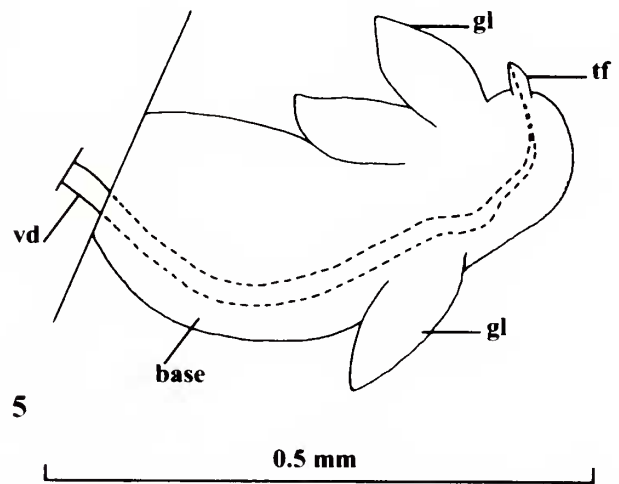
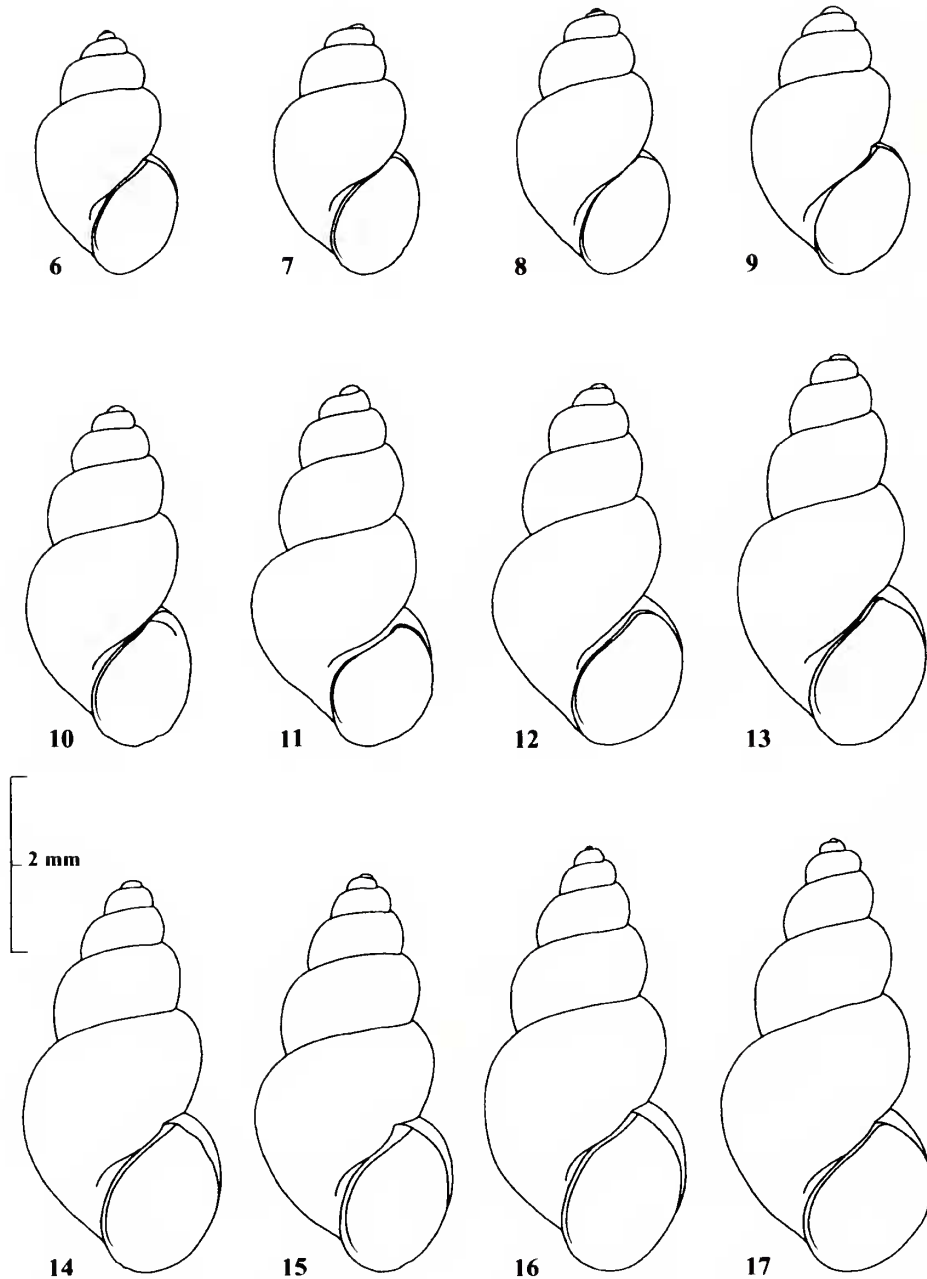


Fig. 5. *Pseudotryonia grahamae* new species. Penis: gl = glandular lobe; tf = terminal filament; vd = vas deferens.

Topotypic Paratypes collected 25 May, 1996: UF 258439.

**Habitat and Distribution.** (Figs. 1, 2, 18). Salt Spring originates from several seeps that flow into a circular mud flat that is ca. 100 m wide. Specimens comprising the paratype series UF 230743, UF 258439 were collected in the spring seeps. Specimens comprising the paratype series UF 230741 were collected from where the seeps converge to form a small shallow brook. The brook flows for ca. 300





**Figs. 6-17.** *Pseudotryonia grahamae* new species. Outline drawings of Paratypes collected from the spring seep shown in Fig. 2. Figs. 6-7: males (UF 230743). Figs. 8-13: females (UF 230743). Figs. 14-17: females (UF 258439).

m to a large, shallow pond, which in turn discharges into Salt Creek. The holotype and paratypes UF 230744 were collected from the shallow brook along a distance of approximately 100 m above the pond (Table 1). The creek in turn flows for ca. 3 miles west to its confluence with the Tombigbee River. *Pseudotryonia grahamae* is ubiquitous on the substrate from the seep area down to the pond. It was not found in the pond, but it was found in Salt Creek

just above its confluence with the Tombigbee River (UF 230745). *P. grahamae* occurred in fine silt at all stations where it was encountered.

The geology of Salt Spring, the type locality, is discussed by Barksdale (1929). The spring issues from the Upper Eocene Hatchigbee Formation. The Hatchigbee Formation forms the Hatchigbee Anticline that lies on a NW-SE axis, and extends over a distance of about 88

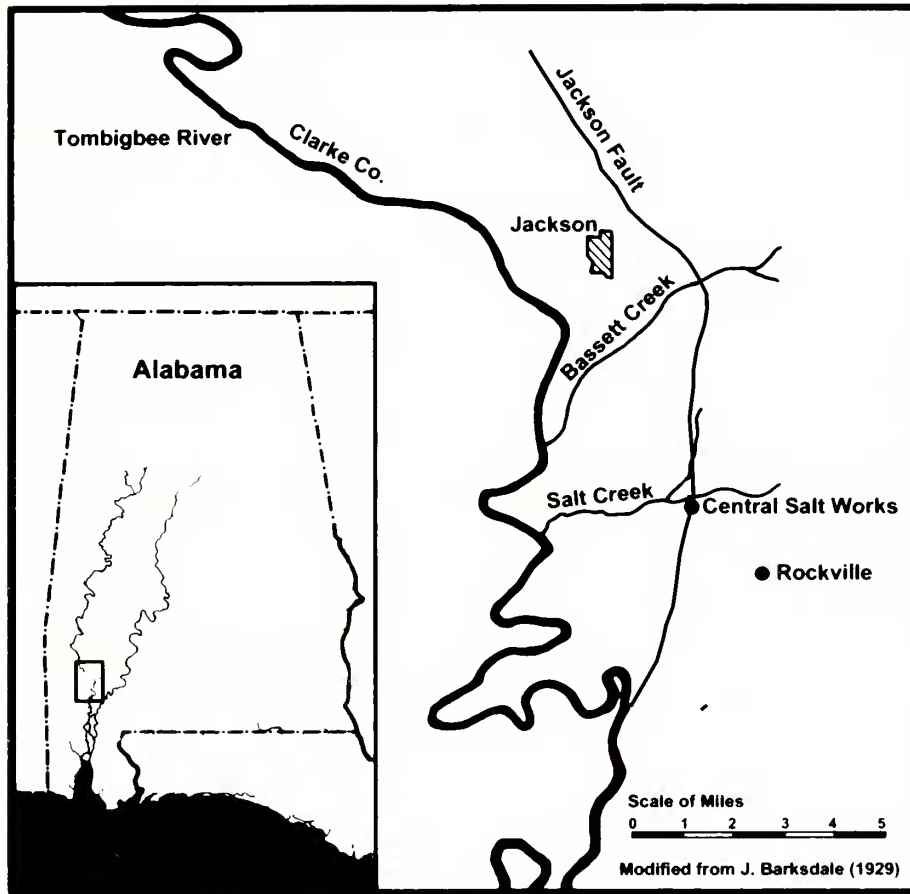


Fig. 18. Map showing the location of Salt Springs, the type locality of *Pseudotryonia grahamae* new species.

kilometers in the Jackson, Alabama area. The water from the spring has an alkalinity of up to 43 ppt. The spring is flooded periodically by the Tombigbee River during high water levels.

**Relationships.** Among known species *Pseudotryonia grahamae* is most similar to *P. brevissima* (Pilsbry, 1890) from central Florida (see Thompson, 1968:52-56; Hershler, 2001:15-19). Both species have a single glandular lobe along the middle of the outer curvature of the penis. *P. brevissima* has a single glandular lobe near the distal end of the inner curvature, whereas *P. grahamae* has two glandular lobes. The two species also share a deeply impressed suture separating the whorls of the shell. The shell of the new species is closely similar to that of *P. brevissima* because of its deeply impressed, channeled suture and by the convex outline of the spire. *P. grahamae* differs from *P. brevissima* by its larger, more attenuated shell, greater number of whorls, smaller aperture, and narrower umbilicus. The shell of large female *P. grahamae* is 4.0-5.0 mm long, with 5.4-6.3 whorls, and is about 0.46-0.56 times as wide as high, with the height of the aperture 0.33-0.44 times the length of

the shell. In *P. grahamae* the umbilicus is reduced to a narrowly rimate perforation. By contrast the shell of large female *P. brevissima* is 3.5-4.4 mm long, with 4.5-5.1 whorls, and is 0.55-0.66 times as wide as long, with the height of the aperture 0.38-0.49 times the length of the shell. In *P. brevissima* the umbilicus is broadly perforate.

**Etymology.** This snail is named for Dr. Becky C. Graham, whose interest in the ecology of Salt Spring led to the discovery of this unusual snail.

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